

## 1.0 INTRODUCTION

**Note:** [Click here](#) for Lessons Learned that may apply to the requirements contained in this LIR.

### 1.1. Background

This Laboratory implementation requirement (LIR) establishes the requirements for the safety basis (SB) for nuclear facilities. The SB comprises those documents on which the National Nuclear Security Administration (NNSA) relies to ensure that the facility is operated safely. The SB includes documents such as the documented safety analysis (DSA), technical safety requirements (TSRs), and the NNSA safety evaluation report (SER). SB documents are one element of the integrated safety management (ISM) process.

This LIR supports and complements the requirements contained in the following documents:

- Laboratory performance requirements (LPRs): 210-01-00, *Comprehensive Site and Facility Planning*; 210-02-00, *Define Work Within Facility*; 210-03-00, *Define the Facility*; 210-04-00, *Define Expectations*; 210-05-00, *Perform Vulnerability Analysis*; 240-01-00, *Define Facility and Tenant Operations Limits and Configuration (Facility Safety Plans)*; 240-02-00, *Managing Facility and Tenant Operations Limits and Configuration*; 270-02-00, *Perform Assessment of Operating Limits and Start-up Tests*;
- IMP 300.2, *Integrated Work Management for Work Activities*
- LIR 300-00-05, *Facility Hazard Categorization*;
- LIR 300-00-07, *Non-nuclear Facility Safety Basis*; and
- LIR 220-01-01, *Construction Project Management*.

OST 300-00-06, *Safety Basis Handbook*, and OST 300-00-06B, *LANL Unreviewed Safety Question Procedure*, establishes the requirements that must be implemented and guidance that must be considered to complement the requirements contained in LIRs 300-00-05, 300-00-06, and 300-00-07.

This revision supersedes NOTICE 118.

The requirements contained in this LIR will be effective upon the date of issue.

### 1.2. In this Document

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## 2.0 PURPOSE

The requirements contained in this LIR must be implemented for the development of LANL nuclear facility SB documents.

## 3.0 SCOPE AND APPLICABILITY

The requirements contained in this LIR will apply to all current and planned nuclear facilities, processes, activities, and operations at the Laboratory.

## 4.0 DEFINITIONS

**Consequence.** The potential effect or result of hazards on workers, the public, or the environment and is used to determine facility categories.

**Critical Decision (CD).** A formal determination at a specific point in a project that allows the project to proceed as defined below:

- CD-0 Approval of Mission Need
- CD-1 Approval of Preliminary Baseline Range
- CD-2 Approval of Performance Baseline
- CD-3 Approval of Start of Construction
- CD-4 Approval of Start of Operations

**Design features.** The design features of a nuclear facility specified in the technical safety requirements that, altered or modified, would have a significant effect on safe operations.

**Documented safety analysis (DSA).** A documented analysis of the extent to which a nuclear facility can be operated safely with respect to workers, the public, and the environment, including a description of the conditions, safe boundaries, and hazard controls that provide the basis for ensuring safety (10 CFR 830).

**Guidance Note:** The DSA is a term defined in 10 CFR 830 and may take the form of a safety analysis report (SAR), basis for interim operations (BIO), health and safety plan (HASP), or transportation safety document (TSD).

**Facility safety plan (FSP).** A document, or collection of referenced documents, which addresses the facility and tenant operations limits and configurations. (See LAUR-98-2837, Section 5.5, LIG 240-01-10.1, "Facility Safety Plan," and LPR 240-01-00 for further details)

**Hazard.** A source of danger (i.e., material, energy source, or operation) with the potential to cause illness, injury, or death to a person or damage to a facility or to the environment (without regard to the likelihood or credibility of accident scenarios or consequence mitigation). (10 CFR 830.3(a))

**Hazard analysis (HA).** The determination of material, system, process, and plant characteristics that can produce undesirable consequences, followed by the assessment of hazardous situations associated with a process or activity. Largely qualitative techniques are used to pinpoint weaknesses in design or operation of the facility that could lead to accidents. The hazards analysis examines the complete

spectrum of potential accidents that could expose members of the public, onsite workers, facility workers, and the environment to hazardous materials. (DOE-STD-3009-94, CN2, page xxv)

**Major modification.** A modification to a DOE nuclear facility that is completed on or after April 9, 2001, that substantially changes the existing safety basis for the facility. (10 CFR 830)

For guidance as to what constitutes a major modification refer to Reference 30, which is available on the PS-4 website, <http://ps.lanl.gov/ps4>.

**Nonreactor nuclear facility.** Those facilities, activities, or operations that involve, or will involve, radioactive and/or fissionable materials in such form and quantity that a nuclear or nuclear explosive hazard potentially exists to workers, the public, or the environment, but does not include accelerators and their operations and does not include activities involving only incidental use and generation of radioactive materials or radiation such as check and calibration sources, use of radioactive sources in research and experimental and analytical laboratory activities, electron microscopes, and X-ray machines. (10 CFR 830)

**Nuclear facility.** A reactor or a nonreactor nuclear facility where an activity is conducted for or on behalf of DOE and includes any related area, structure, facility, or activity to the extent required to ensure correct implementation of the requirements contained in 10 CFR 830, "Nuclear Safety Management."

**Preliminary documented safety analysis (PDSA).** Documentation prepared in connection with the design and construction of a new DOE nuclear facility or a major modification to a DOE nuclear facility that provides a reasonable basis for the preliminary conclusion that the nuclear facility can be operated safely through the consideration of factors such as.

1. The nuclear safety design criteria to be satisfied;
2. A safety analysis that derives aspects of design that are required to implement the nuclear safety design criteria; and
3. An initial listing of the safety management programs that are required to be developed to address operational safety considerations (10 CFR 830).

**Preliminary hazard analysis (PHA).** A document submitted to support Critical Decision (CD)-1 and which defines the facility (or change/modification) boundaries, describes the facility (or change/modification) and related processes, identifies the facility (or change/modification) and process hazards in the detail required to support revision to or validation of the initial facility hazard categorization.

**Radiological facility.** A nuclear facility containing less than a HC-3 quantity of radioactive material. Note: Hazard Categories are defined in LIR 300-00-05.

**Responsible division leader (RDL).** An individual designated by their line management Associate Director (AD) to assume ultimate responsibility, authority and accountability for a facility, and ensure the requirements of LIR 300-00-06, *Nuclear Facility Safety Basis*, and LIR 300-00-07, *Non-nuclear Facility Safety Basis* are met. (LIR 280-02-01.2)

**Safety basis (SB).** The documented safety analysis and hazard controls that provide reasonable assurance that the facility can be operated safely in a manner that protect the worker, the public, and the environment. (10 CFR 830)

**Safety-class structures, systems, and components (SC SSC).** The structures, systems, and components, including portions of process systems, whose preventive or mitigative function is required to limit radioactive hazardous material exposure to the public, as determined from safety analyses. (Ref: 10 CFR 830.3(a)) (Ref: DOE-STD-3009-94, CN2, page xxvii)

**Safety-significant structures, systems, and components (SS SSC).** Structures, systems, and components which are not designated as safety-class structures, systems, and components, but whose preventive and mitigative functions are major contributors to defense in depth and /or worker safety as determined from safety analyses. (Ref: 10 CFR 830.3(a))

**Safety structures, systems, and components (SSC).** Both safety-class structures, systems, and components and safety-significant structures, systems, and components (Ref: 10 CFR 830.3(a)).

**Site boundary.** A well-marked boundary of the property over which National Nuclear Security Administration (NNSA) and Los Alamos National Laboratory (LANL) (owner and operator, respectively) can exercise strict control without the aid of outside authorities.

**Guidance Note:** For the purposes of implementing this and other LIR requirements, the LANL site boundary is defined as the geographic boundary within which public access is controlled and activities are governed by NNSA and LANL, and not by local authorities.

**Guidance Note:** A public road traversing the site is considered to be within the site boundary if, when required, NNSA or LANL has the capability to control the road during accident or emergency conditions. The truck route (East Jemez Rd) is not considered within the LANL site boundary at the time of issuance of this document. Additionally, ongoing land transfer activities may change the site boundary. Questions related to the latest site boundary definition should be addressed to PS-4.

**Technical safety requirements (TSR).** The limits, controls, and related actions that establish the specific parameters and requisite actions for the safe operation of a nuclear facility and include, as appropriate for the work and the hazards identified in the documented safety analysis for the facility: safety limits, operating limits, surveillance requirements, administrative and management controls, use and application provisions, and design features, as well as a bases appendix. (Ref: 10 CFR 830.3(a))

**Unreviewed Safety Question (USQ) process.** The mechanism for keeping a safety basis current by reviewing potential unreviewed safety questions, reporting unreviewed safety questions to DOE, and obtaining approval from DOE prior to taking any action that involves an unreviewed safety question. (Ref: 10 CFR 830.3(a))

## 5.0 LIMITATIONS AND PRECAUTIONS

Nuclear facilities, activities, processes, and operations will be subject to the enforcement actions contained in the *Price Anderson Amendments Act*.

## 6.0 INDIVIDUAL AND ORGANIZATIONAL IMPLEMENTATION REQUIREMENTS

Responsible Party	Will be responsible for...
Responsible Division Leader (RDL)	<ul style="list-style-type: none"> <li>Establishing an authorized facility safety basis which must be maintained and reviewed in accordance with the requirements contained in this LIR;</li> <li>Establishing and managing facility-specific expectations and performance assurance mechanisms, as required, to maintain the facility safety basis and to ensure all work in the facility is conducted within the established facility safety basis;</li> <li>Ensuring workers, including those from tenant organizations, are involved in developing the facility safety basis;</li> <li>Ensuring safety basis documents are submitted to the Safety Basis Office (SBO, PS-4) for review;</li> <li>Reviewing and approving radiological facility safety basis documents;</li> <li>Reviewing and forwarding HC-1, -2, and -3 facility safety basis documents to NNSA for approval;</li> <li>Ensuring that the SBO and Emergency Management &amp; Response (EM&amp;R) receive controlled copies of approved facility safety basis documents;</li> <li>Ensuring that Emergency Management and Response (EM&amp;R) receives copies of 90% review safety basis documents; and</li> <li>Requiring project management techniques for the preparation of safety basis documents. LANL project management requirements are given in IMP 352.0, <b>Project Management</b>.</li> </ul>
Deputy Responsible Division Leader	<ul style="list-style-type: none"> <li>If a Deputy Responsible Division Leader (DRDL) has been appointed, the DRDL will be directly responsible and accountable for those safety basis responsibilities assigned to the DRDL in the individual position description.</li> </ul>
PS-4, Safety Basis Office (SBO) Leader	<ul style="list-style-type: none"> <li>Providing institutional interpretation of the requirements contained in this LIR;</li> <li>Providing technical assistance in hazard and accident analyses for safety basis purposes;</li> <li>Reviewing and concurring all draft PDSAs, PDSAs, DSAs, TSRs, USQs, annual reviews, USQ determination summaries, changes to SB documents and correspondence relating thereto, before submittal to NNSA;</li> <li>Conducting independent reviews of DSAs and TSRs to ensure implementation of the requirements contained in this LIR and for</li> </ul>

Responsible Party	Will be responsible for...
	<p>ensuring the technical criteria have been implemented;</p> <ul style="list-style-type: none"> <li>Ensuring that personnel are qualified to conduct quality and technical review of safety basis documents and processes;</li> <li>Providing institutional liaison between Laboratory facilities and the NNSA/LASO for resolution of safety basis issues;</li> <li>Assisting the RDLs and project offices with coordination of priorities and resources for establishing and maintaining safety bases;</li> <li>Making recommendations to the RDL and AD regarding the adequacy of safety basis documents;</li> <li>Maintaining and updating the NNSA-approved nuclear facility list; and</li> <li>Maintaining and updating the radiological facility list.</li> </ul>
Tenant Division Leader	<ul style="list-style-type: none"> <li>Providing assistance in developing the DSA and TSR;</li> <li>Training facility workers in the DSA and TSR;</li> <li>Using only controlled copies of DSA and TSR in facility operations, and</li> <li>Ensuring all work is performed in accordance with the SB.</li> </ul>

## 7.0 FACILITY IMPLEMENTATION REQUIREMENTS

### 7.1. Facility Safety Basis: Hazard Category 1, 2 and 3 Nuclear Facilities

- Safety Basis documents must be prepared in accordance with the requirements contained in this LIR and in accordance with the procedures outlined in OST 300-00-06, *Safety Basis Handbook*. Listed below are the procedures and a statement of their applicability and whether they constitute a requirement (mandatory) or guidance. All requirements contained in the Handbook must be implemented, and any guidance contained in the Handbook will be considered to the fullest extent.

#### OST 300-00-06 Safety Basis Handbook

Section No.	Title	Applicability Statement
Section 1	LANL Hazard Analysis Technical Methodology Handbook	<b>Mandatory Document</b> The methodology requirements contained in this handbook will be implemented in the development of any HA, preliminary hazard analysis (PHA), or PDSA prepared for a nuclear facility SB.
Section 2	Guidelines for Performing Atmospheric Dispersion Analysis	<b>Guidance Document</b> This document should be used as guidance by individuals performing atmospheric dispersion calculations for a DSA, PDSA, BIO, or other SB documents.
Section 3	LANL Safety Basis Calculation Sheet	<b>Mandatory Document</b> This document will apply to all technical calculations and analysis that support SB documents such as DSAs, HAs, PDSA, USQs, and TSRs.

Section No.	Title	Applicability Statement
Section 4	Review Plan for Nuclear Safety Analysis Documents	<b>Mandatory Document</b> A set of SB review criteria that will be followed by independent reviewers and developers of safety basis documents. The applicable sections of the checklist will be filled in by the organization developing the DSA, and accompany any draft DSA, PDSA, or BIOs to be officially reviewed by the SBO.
Section 5	Generic Technical Safety Requirements	<b>Mandatory Document</b> This document will be used for developing TSRs including safety limits, limiting control settings, limiting condition for operation, administrative controls, design features, definition and use section, and bases statements and supports the TSR template.
Section 6	Technical Safety Requirements Template	<b>Mandatory Document</b> This document will be used as a template for developing a TSR document.
Section 7	Documented Safety Analysis Generic Chapters 6-17 Adaptation to Technical Safety Requirements Administrative Controls	<b>Guidance Document</b> This document should be used for meeting the intent of guidance provided by DOE-STD-3009-94 for developing programmatic chapters of a SAR, i.e., Chapters 6 - 17.
Section 8	LANL TSR Surveillance Procedure Writers Guide	<b>Mandatory Document</b> This document will be used for writing surveillance procedures for TSRs.
Section 9	LANL TSR Mode Change Guide	<b>Mandatory Document</b> This document will be used for writing mode change procedures for TSRs.
Section 10	Nuclear Facility Safety Basis Document Maintenance, Change, Review and Update Procedure	<b>Mandatory Document</b> This document will be used as a template for developing the facility procedure for maintaining safety basis documents, for making changes to TSRs, for conducting annual review of DSA, and for updating safety basis documents as a result of the annual review, and for submitting the annual USQ summary report to NNSA. (Note: Changes to DSA are submitted per OST 300-00-06B.)
Section 11	LANL Safety Basis Implementation Plan	<b>Mandatory Document</b> This document will be used as a template for developing an implementation plan.

- The documents which comprise the SB must define the scope of work to be performed by the facility; identify and analyze the hazards associated with the work; categorize the facility in accordance with LIR 300-00-05, *Facility Hazard Categorization*, and establish hazard controls to ensure protection of the worker, the public and the environment.
- The SB must be updated to ensure its currency and to reflect changes in the facility, the work, and the hazards as they are analyzed in the DSA.

4. The DSA must be reviewed annually, updated and submitted through PS-4 to the NNSA for approval. If the DSA does not require change, then a letter stating that no changes have occurred will be forwarded through PS-4 to the NNSA by the RDL.
5. The SB must incorporate any NNSA-directed changes, conditions, or hazard controls.
6. Nuclear facilities must be placed on the NNSA-approved nuclear facility list at [http://ps.lanl.gov/ps4/internal\\_links.shtml](http://ps.lanl.gov/ps4/internal_links.shtml).
7. Removal of a facility from the nuclear facility list must be by NNSA-approved petition.
8. A DSA/TSR implementation plan (IP) (developed in accordance with the requirements contained in Section 11 of OST 300-00-06, *Safety Basis Handbook*) must be submitted concurrently with the DSA and the TSR, must be approved by NNSA, must be considered part of a facility safety basis, and must require NNSA-approval prior to implementing any change to the IP. Preparation of a material equipment list (MEL) must be included in the IP.

#### **7.1.1 Unreviewed Safety Question Process**

1. A HC-1, -2, or -3 nuclear facility must establish, implement and take actions consistent with a USQ process. OST 300-00-06B, *LANL Unreviewed Safety Question Procedure*, Rev. 3 (Ref. 31) as amended by Ref. 32 (see <http://ps.lanl.gov/ps4/pdfs/300-00-06B.pdf>) describes the Unreviewed Safety Question (USQ) Process required by 10 CFR 830.203 for changes at Hazard Category 1, 2, and 3 nuclear facilities at Los Alamos National Laboratory (LANL).
2. The USQ process is not permitted for a major modification. See Section 7.1.4 for the development of a PDSA for a major modification.

#### **7.1.2 Documented Safety Analysis**

The DSA must be prepared using the methodology listed below or as otherwise approved by NNSA:

<b>Type of facility</b>	<b>Will prepare a DSA in accordance with the requirements contained in...</b>
Nonreactor nuclear facility	DOE-STD-3009-94
Nuclear facility with a limited operational life	DOE-STD-3009-94 or DOE-STD-3011-2002
Deactivation or transition to surveillance and maintenance of a nuclear facility	DOE-STD-3009-94 or DOE-STD-3011-2002
Decommissioning of nuclear facility	DOE-STD-1120-98, provisions of 29 CFR 1910.120 for developing Safety and Health Programs, HASP and Emergence Response Plans (ERP); and controls from Safety and Health Programs, Work Plans, HASP, and the ERP.
Environmental restoration activity that involves work not done in a permanent structure or the decommission of a facility with only low-level residual fixed radioactivity	DOE-STD-1120-98, and provisions of 29 CFR 1910.120 (or 29 CFR 1926.65 for construction activities) for developing a Safety and Health Programs and a site-specific HASP (including elements of ERP, conduct of operations, training and qualifications, and maintenance management).



<b>Type of facility</b>	<b>Will prepare a DSA in accordance with the requirements contained in...</b>
Nuclear explosive facility	DOE-STD-3009-94 for facility and generic nuclear explosive operations and DOE-STD-3016-99.
HC-3 nonreactor nuclear facility	Chapters 2, 3, 4, and 5 of DOE-STD-3009-94 with a qualitative hazard analysis and hazard controls (consisting primarily of inventory limits and safety management programs and their bases).
Transportation activities	Preparing a safety analysis report for packaging (SARP) in accordance with DOE O 460.1 and TSD in accordance with DOE G 460.1-1.
Transportation and onsite transfers	Preparing a SARP in accordance with DOE O 460.1 and TSD in accordance with DOE M 461.1-1.

A final DSA for new construction must be based on “as built” and “as proposed to operate” compared to a typical DOE-STD-3009-94 “as built, as operated” basis.

The DSA must:

1. Describe the facility, activity, process, operation, and the work to be performed, including the design of any associated safety systems, structures, and components (SSCs);
2. Include a systematic identification of both natural and man-made hazards associated with the facility, including the development of a fire hazards analysis (FHA);
3. Contain an evaluation of normal, abnormal and accident conditions including natural and man-made external events, identification of energy sources or processes that could contribute to the generation or uncontrolled release of radioactive and other hazardous material, and consideration of the requirement for analysis of accidents, and events that go beyond the design basis of the facility;
4. Include the hazard controls as required to ensure the protection of the worker, the public and the environment; demonstrate the adequacy of these controls to eliminate, limit, or mitigate identified hazards; and define the process for maintaining the hazard controls current at all time and controlling their use;
5. Define the characteristics of the safety management programs required to ensure the safe operations of the facility including quality assurance, procedures, maintenance, personnel training, conduct of operation, emergency preparedness, fire protection, waste management, and radiation protection;
6. Define the criticality safety program required when the quantity of fissionable material is present to form a potential for criticality to:
  - a. Ensure that operations with fissionable material remain subcritical under all normal and credible abnormal conditions.
  - b. Identify required nuclear criticality safety standards, and
  - c. Describe how the program meets the required nuclear criticality safety standards.

### 7.1.3 Technical Safety Requirements

1. The HC-1, -2, or -3 nuclear facility TSRs must be derived from the DSA.
2. The TSR and any changes to the TSR must be approved by the NNSA prior to use. TSRs will be developed following the requirements outlined in Section 5, Section 6, Section 8, and Section 9 of OST 300-00-06, *Safety Basis Handbook*.
3. NNSA must be notified of any TSR violation.
4. Emergency actions that depart from an approved TSR may be taken when no actions consistent with the TSR are immediately apparent and when these actions are necessary to protect the worker, the public and the environment from imminent and significant harm. A person in authority, as designated in the TSR, must approve these emergency actions. NNSA must be notified of the actions taken as soon as practicable.
5. Environmental restoration activities may follow the provisions of 29 CFR 1910.120\_or 29 CFR 1926.65\_to develop the appropriate hazard controls provided the activity involves either
  - a. Work not done within a permanent structure, or
  - b. The decommissioning of a facility with only low-level residual fixed radioactivity.
6. The TSR document will be reviewed annually and concurrently with the DSA; however, the TSR need only be submitted by the RDL to NNSA if the review results in a change to the TSR document.

### 7.1.4 Preliminary Documented Safety Analysis

1. The construction of a new HC-1, -2, or -3 nuclear facility or major modification to an existing HC-1, -2, or -3 nuclear facility will require the preparation of a PDSA. Section 1 of OST 300-00-06, *Safety Basis Handbook*, contains the requirements which must be met in the development of a PDSA.

**Guidance Note:** Development of a PDSA is the process whereby facility hazards are identified, controls to prevent and mitigate potential accidents involving those hazards are proposed, and commitments are made for design, construction, operation, and disposition so as to assure adequate safety at DOE nuclear facilities. Project plans to develop the draft PDSA and PDSA should be coordinated with PS-4 to ensure agreement on scope, participation in design reviews, review schedules, and potential project costs for performing required reviews.

2. For a major modification of a nuclear facility, a preliminary documented safety analysis (PDSA) must be developed and approved by NNSA before procuring materials and components or beginning construction.

**Guidance Note:** There is no clear distinction as to what constitutes a major modification because the definition provided in 10 CFR 830 does not consider project/financial risk which the major modification

definition/process is intended to help manage. Therefore, consultation with NNSA may be necessary to arrive at a final decision as to whether the change constitutes a major modification and warrants development of a preliminary documented safety analysis.

3. As a general rule, NNSA does not expect preliminary documented safety analyses to be required for activities that are not major modifications and do not involve significant construction, activities such as environmental restoration activities, decontamination and decommissioning activities, specific nuclear explosives operations, or transition to surveillance and maintenance activities. For activities that are not major modifications, the USQ process should be used to determine if NNSA approval is needed.
4. The PDSA must be approved by the NNSA before the contractor can procure materials or components or begin construction.

**Guidance Note:** The NNSA may authorize the contractor to perform limited procurement and construction activities without approval of a PDSA if NNSA determines that the activities are not detrimental to the public, the worker, and the environment and are in the best interests of NNSA. Authorization of limited activities does not supersede NNSA's review of the PDSA.

5. The PDSA must be prepared to ensure a reasonable basis for the preliminary conclusion that the nuclear facility can be operated safely through the consideration of factors such as:
  - a. The nuclear safety design criteria to be satisfied;
  - b. A safety analysis that derives aspects of design that are required to satisfy the nuclear safety design criteria; and
  - c. An initial listing of the safety management programs that must be developed to address operational safety considerations.
6. The PDSA must contain:
  - a. A description of the preliminary design of the facility with respect to safety SSCs and safety design features.
  - b. Documentation of the preliminary approaches to startup and operations management.
  - c. Descriptions and commitments to NNSA for contractor management and oversight of construction projects.

**Guidance Note:** Most such programmatic commitments would be found in the associated program control documentation, rather than in the PDSA)

7. The PDSA will be prepared by implementing the following methodology requirements:
  - a. Obtain approval of the nuclear safety design criteria to be used in the preparation of the PDSA unless the design criteria are from DOE O 420.1A.

- b. Document how the nuclear safety design criteria are proposed to be satisfied and implemented.

**Guidance Note:** Use of DOE-STD-3009-94 is not required for the development of a PDSA but should be used to the greatest extent possible. DOE in contractor forums has indicated that the safe harbor list in Appendix A does not apply to the PDSA even though the PDSA is discussed under both the DSA section of Appendix A and in the DOE DSA implementation guide.

- c. Ensure the required functional attributes of safety SSCs are focused upon.
- d. Identify research of other data collection that is required to finalize the design.
- e. Maintain continuous interaction between NNSA, designers and safety analysts to ensure that safety will be designed in rather than added on, per DOE G 420.1-1 and related DOE O 420.1A. All hazards should be addressed as early as possible in the design of new nuclear facilities or major modifications so that passive and active design concepts can be economically incorporated into the design so as not to rely solely on procedural and administrative controls to address worker and public safety.

**Guidance Note:** NNSA may impose changes that might cause redesign and reanalysis of the project.

- f. Where the PDSA relies upon the content of other project documents, these documents will be summarized, referenced, and submitted to NNSA with the PDSA.
  - g. The system design description(s) (SDDs) and the fire hazard analysis (FHA) are required documents that must accompany the PDSA.
8. A draft PDSA must be submitted to NNSA to support a CD-2 milestone and the PDSA must be submitted to NNSA to support a CD-3 milestone. (See LIR 220-01-01).

**Guidance Note:** The draft PDSA is submitted to support a preliminary design package; NNSA approval of a draft document (i.e., a work in progress) is not the objective of the draft PDSA submittal. The process for development of a draft PDSA is outlined in Section 1 of OST 300-00-06, *Safety Basis Handbook*.

9. The PDSA, after approval, must be a controlled document until it is replaced by the DSA. The PDSA then becomes a QA record.

**Guidance Note:** The PDSA required by 10 CFR 830.206 may need updating to sustain the reliability of the information it contains, until such time as it is superseded by a final DSA.

10. The HC-1, -2, or -3 nuclear facility must update the PDSA as required to ensure it remains responsive to the evolving design so that the NNSA can continue to rely on the information in

the PDSA. The change control process used to update or modify the PDSA is the change control process defined in the NNSA-approved Project Execution Plan (PEP).

### 7.1.5 Safety Basis Approval Requirements

1. The DSA (including an updated fire hazards analysis [FHA]), TSR, and IP for a HC-1, -2, or -3 nuclear facility must be submitted concurrently to NNSA for approval.
2. The approval of the SB is documented in the NNSA-developed safety evaluation report (SER). The NNSA SER may contain additional actions or conditions that will be required for operation of the nuclear facility.
3. All draft PDSAs, PDSAs, DSAs, TSRs, USQs, annual reviews, USQ determination summaries, changes to SB documents and correspondence relating thereto and submitted to NNSA must be reviewed by the SBO before submittal to NNSA. Section 10 of OST 300-00-06, *Safety Basis Handbook*, outlines the procedures that will be followed for the maintenance, change, review, and update of SB documents.
4. All requests to NNSA for changes to SB documents must include the following requirements:
  - a. Change requests must be based only on the currently approved documents.
  - b. The exact and final page changes must be provided (i.e., all pages that contain changes including pagination, renumbering, etc.).
  - c. All technical and text changes must be clearly and consistently marked and provided, in addition to the exact changed pages identified in b. above.

**Guidance Note:** In addition to the requirements contained within this LIR, the following LANL operational support tool (OST) has been developed by the SBO.

OST Number	OST Title	Applicability Statement
300-00-06B	<i>LANL Unreviewed Safety Question Procedure</i>	<b>Mandatory Document</b> Revision 3 of this procedure (Ref. 31) as amended by Ref. 32 describes the Unreviewed Safety Question (USQ) Process required by 10 CFR 830.203 for changes at Hazard Category 1, 2, and 3 nuclear facilities at Los Alamos National Laboratory (LANL).

### 7.2. Requirements for Below Hazard Category 3 Nuclear Facilities (i.e., Radiological Facilities)

1. All facility categorizations must be performed in accordance with LIR 300-00-05, Facility Hazard Categorization.
2. A facility safety plan (FSP), which meets the requirements outlined in LPR 240-01-00, will comprise the safety basis documents for a radiological facility.

**Guidance Note:** The FSP for a radiological facility may be combined with the safety basis documentation for the non-nuclear facility hazard

category requirements. Guidance in the development and implementation of a FSP is provided in LIG 240-01-10.

3. The RDL must approve the facility safety plan and authorize operations.
4. The facility safety plan must support the facility hazard category determination.
5. Radiological facilities will be exempt from 10 CFR 830 Subpart B; however, the quality assurance requirements of 10 CFR 830, Subpart A, "Quality Assurance," and requirements of 10 CFR 835, "Occupational Radiation Protection," must apply to radiological facilities and are enforced under the *Price Anderson Amendments Act*; i.e., radiological facilities are subject to 10 CFR 820, "Procedural Rules for DOE Nuclear Activities."
6. Radiological facilities must ensure administrative controls requirements are in place to track and account for radioactive material to ensure Hazard Category 3 (HC-3) thresholds quantities (TQs) defined by DOE-STD-1027-92, Attachment 1, are not exceeded through introduction of new radioactive material.
7. ANSI-certified sealed sources need not be included in the radioactive material inventory used to determine HC-3 TQ limits only for facility categorization purposes; however, those sealed sources must be entered into the Laboratory Radioactive Sealed Source Accountability and Control System (LRACS) database and leak tested every six months or as required by LIR 402-700-01, Chapter 16.

**Guidance Note:** Material contained in DOT Type B shipping containers (with or without overpack), may also be excluded from summation of a facility's radioactive inventory for facility categorization purposes only if the Certificates of Compliance are kept current and the materials stored are authorized by the Certificate.

8. Annually, the SBO must submit to NNSA a compilation of inputs from radiological facilities radioactive material inventories, a listing of the procedures used by the facilities to account for and to track radioactive materials, and an affirmation from the radiological facility RDL's or designate that the inventory of radioactive material has not exceeded HC-3 TQ level at any time during the past year.

**Guidance Note:** The RAM (radioactive material) procedure for accountability and tracking of radioactive material should establish ratio limits that may not be exceeded without line management written approval.

**Guidance Note:** Facilities with combinations of radioactive isotopes should track the sum of ratios of the quantity of each radioactive material to the HC-3 TQ to ensure the ratio never exceeds 1.0. For example:

$$\sum_{i=1}^{i=n} \frac{A_i}{TQ_i} \leq 1,$$

where

- A = Amount of isotope in curies or grams  
TQ = HC-3 threshold quantity of isotope in curies or grams,  
and  
i = represents any isotope identified in LA-12981-MS.

## 8.0 DOCUMENTATION

### 8.1. Distribution and Ownership

1. All approved DSAs and TSRs must be maintained as controlled documents.
2. The OIC for this LIR will be the Safety Basis Office (PS-4).
3. The RDL must ensure the SBO and Emergency Management and Response (EM&R) are provided with a controlled copy of the approved facility DSA and TSR documents.
4. The RDL must provide Emergency Management and Response (EM&R) with a copy of the DSA at the 90% completion milestone.

**Guidance Note:** EM&R reviews these documents to determine applicability of an emergency planning hazard assessment in accordance with LIR 403-00-01. In addition, a controlled copy of the DSA is maintained at the Emergency Operations Center.

### 8.2. References

1. 10 CFR 820, "Procedural Rules for DOE Nuclear Activities"
2. 10 CFR 830, "Nuclear Safety Management"
3. 10 CFR 835, "Occupational Radiation Protection"
4. 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response (HAZWOPER)"
5. 29 CFR 1926.65, "Hazardous Waste Operations and Emergency Response"
6. 40 CFR 302, "Designation, Reportable Quantities, and Notification"
7. DOE G 460.1-1, *Packaging and Transportation Safety*
8. DOE M 461.1-1, *Packaging and Transfer of Materials of National Security Interest Manual*
9. DOE O 420.1A, *Facility Safety*
10. DOE O 460.1B, *Packaging and Transportation Safety*

11. DOE-STD-1027-92, Chg 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*
12. DOE-STD-1120-98, *Integration of Environment, Safety, and Health into Facility Disposition Activities*
13. DOE-STD-3009-94, Chg 2, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Documented Safety Analysis Reports*
14. DOE-STD-3011-2002, *Guidance for Preparation of Basis for Interim Operation (BIO) Documents*
15. DOE-STD-3016-99, *Limited Standard; Hazard Analysis Reports for Nuclear Explosive Operations*
16. LA-12981-MS, *Table of DOE-STD-1027-92 Hazard Category 3 Threshold Quantities for the ICRP-30 List of 757 Radionuclides*
17. LIG 240-01-10, *Facility Safety Plan*
18. LIR 220-01-01, *Construction Project Management*
19. LIR 300-00-05, *Facility Hazard Categorization*
20. LIR 402-700-01, *Occupational Radiation Protection Requirements*
21. LIR 403-00-01, *Los Alamos National Laboratory Emergency Management*
22. LPR 210-01-00, *Comprehensive Site and Facility Planning*
23. LPR 210-02-00, *Define Work Within Facility*
24. LPR 210-03-00, *Define the Facility*
25. LPR 210-04-00, *Define Expectations*
26. LPR 210-05-00, *Perform Vulnerability Analysis*
27. LPR 240-01-00, *Define Facility and Tenant Operations Limits and Configuration (Facility Safety Plans)*
28. LPR 240-02-00, *Managing Facility and Tenant Operations Limits and Configuration*
29. LPR 270-02-00, *Perform Assessment of Operating Limits and Start-up Tests*
30. NNSA Memorandum, C. Steele, NNSA, LASO SABM to J. Angelo, LANL, PS-DL, SABB/JWH-04-0016, "Approval of Major Modification Definition," December 20, 2004.
31. OST 300-00-06B, *LANL Unreviewed Safety Question Procedure*, Rev. 3  
(<http://ps.lanl.gov/ps4/pdfs/300-00-06B.pdf>)



**Nuclear Facility Safety Basis**

Los Alamos National Laboratory

Laboratory Implementing Requirements **LIR 300-00-06.5**

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**Mandatory Document**

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32. Memo, *Approval of Revised LANL Unreviewed Safety Question (USQ) procedure Submitted September 23, 2004 with Required Safety Basis Conditions for Readiness Verification*, Christopher M. Steele (LASO SABM) to Jim Angelo (PS-DO), September 27, 2004 (<http://ps.lanl.gov/ps4/pdfs/300-00-06B.pdf>)
33. LIR 300-00-07, *Non-nuclear Facility Safety Basis*
34. OST 300-00-06, *Safety Basis Handbook*
35. LAUR-98-2837, *Los Alamos National Laboratory Integrated Safety Management*, Rev. 1, 9/17/98
36. LIR 280-02-01, *Institutional Facility Management: Responsible Division Leader-Facility Manager*
37. DOE G 420.1-1, *Nonreactor Nuclear Safety Design Criteria and Explosives Safety Criteria Guide for use with DOE O 420.1, Facility Safety*
38. IMP 352.0, *Project Management*